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Street & park trees for Wis. communities.

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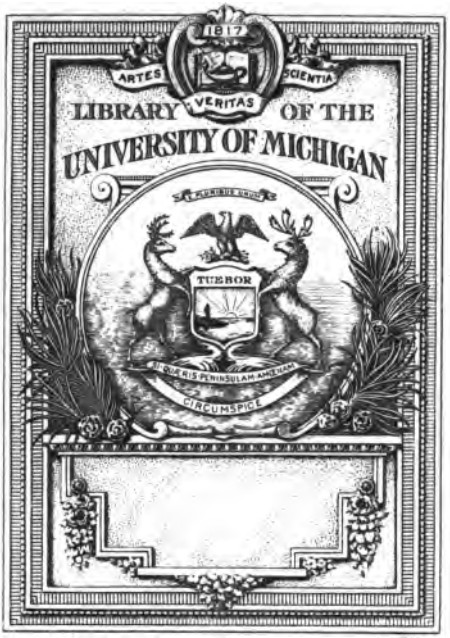

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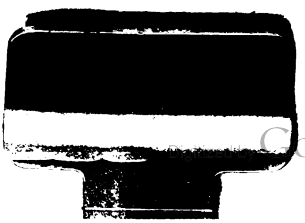

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STATE OF WISCONSIN

CONSERVATION COMMISSION

BULLETIN 2

Street and Park Trees

FOR

Wisconsin Communities

By

M. A. CASTLE

MADISON, WISCONSIN
CANTWELL PRINTING CO., STATE PRINTERS
1916

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CONSERVATION COMMISSION

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FOREWORD

This pamphlet has been prepared to aid those who apply to the State Conservation Commission for information in regard to the planting of trees on streets and in parks. The material has been compiled from various sources.

Acknowledgment is due the Conservation Commission of New York for valuable material from Bulletin 7, Shade Trees, by F. A. Gaylord; to the New Jersey Forest Commission for valuable material from The Planting and Care of Shade Trees, by Alfred Gaskill; to Cornell University for valuable suggestions and material from Bulletin 361, The Home Grounds, by E. G. Davis and R. W. Curtis; and to Professor J. G. Sanders, State Entomologist of Wisconsin, for very valuable suggestions and criticism.

Acknowledgment is made also of the loan of cuts by the New York Conservation Commission, the New Jersey Forest Commission, the American Forestry Magazine and John Wiley & Sons, publishers of Shade Trees in Towns and Cities, by William Solotaroff, and Studies of Trees, by J. J. Levison.

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A drive through the woods, near Madison, Wisconsin. Native trees and shrubs make beautiful woodland parks. (By courtesy of the Madison Park and Pleasure Drive Association.)

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STREET AND PARK TREES

CIVIC IMPROVEMENT.

The Interest in Civic Improvement.

There is at present an almost universal movement toward the improvement and adornment of the streets and public grounds in every community. This work is carried forward by all kinds of organizations, village improvement associations, women's clubs, park commissions, and many other bodies more or less representative of the various communities. There is no question that the right civic spirit is at work, and with a little proper and well-timed guidance, great things can be accomplished.

In the majority of communities, the most that can be accomplished under the various forms of local organization, is the improvement of streets and public ground within the present limitations of size and location, or the care of existing street trees, with the possible acquisition of some additional ground for a public park. For this reason, the suggestions offered will be mainly along the line of the planting of parks and street trees; but as the civic spirit now at work through local organizations of necessarily limited powers will undoubtedly develop to the point where there will be a demand not alone for the mere embellishment or adding on of ornament to existing public ground, but for the development of the entire community on lines that will insure the right location of all public utilities and buildings for the greatest efficiency in civic life and with the proper regard for adequacy and beauty, a few general suggestions will be offered.

Local improvement societies of voluntary organization can accomplish certain results, and since they cannot have the definite authority and assured income of city park commissions or city planning commissions, it is well that they should at least consider the problems that are met by the larger and more powerful organizations, and the general principles that should govern the solution of such problems, in order to lay a foundation for larger and more comprehensive work.

The Importance of a Preliminary Plan.

No one would build a house without first considering his family's needs and making a preliminary plan. It is even customary to so plan a house that it can be enlarged at a later time to meet further needs. Why, then, do we let a community develop in a haphazard manner with no regard for general convenience, present appearance or future needs? Surely the community is of more importance than any single building, and if as much attention and expense and skill were applied to a com-

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munity plan, as are applied every day to the building of a single library or school or other public building, what a tremendous benefit would result.

Streets well located and designed, public buildings and grounds suitably located and planned, private development of business projects and home building so regulated that the best interests of the entire community are served, these are the problems that each community, as it grows, should study continually, so as to guard against public inconveniences and inefficiency. Communities must grow and that growth should be so guided that it will result in improvement and not in deterioration.

The growth of a town from year to year may seem small but the U. S. census shows us that while there were only twelve large communities in this country in 1800 which contained 4 per cent of the population, there were, in 1900, 545 large communities and they contained over 33 per cent of the total population. Thus in the nineteenth century there came into existence 533 new communities of 8000 or more in population. Not only is there a constant increase in the growth of communities, but those in the western states are yet in earlier stages of development, and therefore the improvement of these communities and the adaptation of them to a larger growth, will be less handicapped than in communities of advanced growth. There is less to be undone.

STREETS.

The street plan is the foundation of all city planning. We cannot too strongly emphasize the importance of streets properly laid out and of adequate width for the free circulation of foot passengers, vehicles, and street cars where necessary. Proper street planning promotes civic efficiency and economy, and the health, comfort and pleasure of citizens.

Width of Streets.

Main thoroughfares should be of ample width to meet present and future needs, considering not only street traffic but the relation to it of railway and waterway traffic.

Wider streets permit higher buildings; hence landowners should favor them. The economy in making streets wide enough at first rather than widening them afterward, should be apparent. The intellectual city of Boston has spent about forty million dollars since 1822 in street widenings, straightenings, and extensions, and Boston streets are not all wide or straight at this time. It has cost the people of the little town of Brookline, Massachusetts, six hundred and fifteen thousand dollars to widen Beacon street from fifty to one hundred and eighty feet for a distance of two miles.* This change resulted in an increased real estate value in six years for a distance of only about five hundred feet from the side lines, of over four million dollars. The city might have had this larger real estate value without the enormous preliminary cost if forethought had been exercised.

Residence streets should be of ample width, especially where residence districts may later have to give way before the advance of commercial districts, but there should not be hard and fast regulations as to the uniform size of city blocks or the uniform width of streets in all parts of a

*John Nolen, in Proceedings of the Second National Conference on City Planning, Rochester, N. Y., May 2–4, 1910. p. 148.

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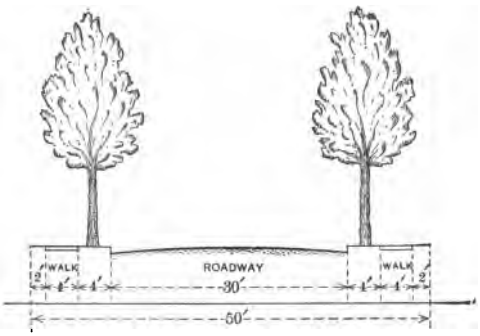
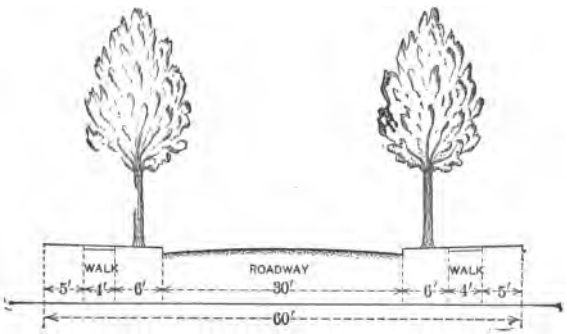
city, for local streets, which serve only the residents of a small neighborhood, may be narrower and serve every purpose and if a main thoroughfare cross many local streets, the reasonable narrowing of those streets may result in a considerable shortening of the thoroughfare with no loss of frontage for business houses. Moreover, deep lots should not be required in districts where low rents are a necessity, for in such districts, usually densely populated, buildings stand close and deep lots result in the erection of buildings of extreme length compared to their width, with consequent loss of light and air.



Layout of a street fifty feet wide from property line to property line.

However, a community should adopt a width and design for all streets of each class, together with a plan for the parking or planting of shade trees on all residence streets. John Nolen has said that* "the two most urgent needs of American city street planning are a greater differentiation



Layout of a street sixty feet wide. By courtesy of John Wiley & Sons, New York, publishers of *Shade Trees in Towns and Cities*, by William Solotaroff.

in the width of streets, and an apportionment of any given width so as to meet more successfully the demands of travel combined with due regard to the streets' appearance."

*In Proceedings of the Second National Conference on City Planning, Rochester, N. Y., May 2–4, 1910. p. 148.

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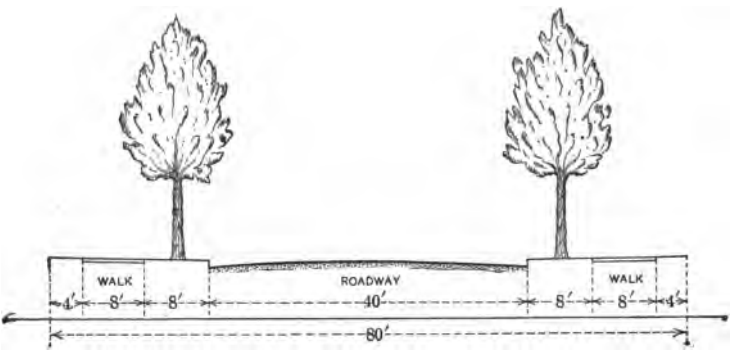
The cost of paving and maintenance is, of course, larger in proportion to the width of a street, and there is a greater area from which dust will rise, and sweeping and sprinkling or oiling the surface costs relatively more. Care should be exercised to determine as nearly as possible beforehand what streets will become the main lines of traffic, what will become pleasure drives, and where street car lines will be permitted, in order to determine the proper width of these streets and of the residence streets.



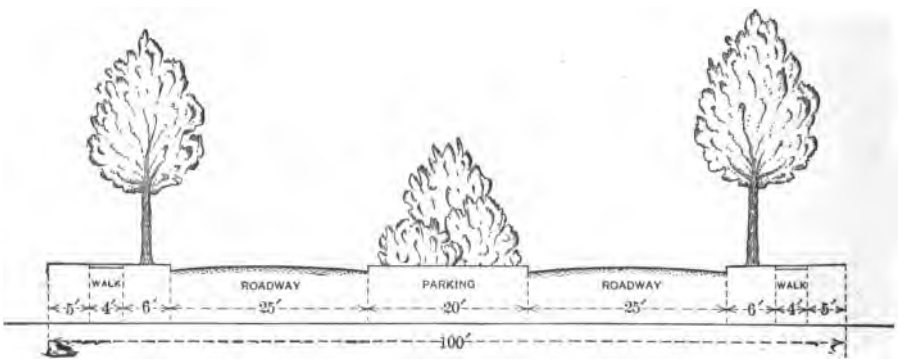
Layout of a street eighty feet wide.

Design of Streets.

For residence streets where the houses are set back from the walks not less than 20 feet, the usual division is two-fifths for sidewalks and park strip, and three-fifths for roadway.

Location of Streets.

After the future needs of a community in relation to main thoroughfares have been carefully considered, there remain two important considerations aside from economy and adequacy, in planning its residence streets.



Layout of a street one hundred feet wide: two rows of trees and a parking space for shrubs in center By courtesy of John Wiley & Sons, publishers of *Shade Trees in Towns and Cities*, by William Solotaroff.

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Direct Routes.

It is highly important for the general good, that there be direct routes between important points. Diagonal streets should be laid out wherever necessary. How many communities in Wisconsin, having meekly followed for years a beaten route around three sides of a square, to reach a railway station or some other important point because of the faulty location of a bridge or the presence of an ungraded hill, have traveled three times as far as was necessary, have hauled their freight three times as far as necessary, have wasted two-thirds of their time. Civic efficiency demands direct routes, even at considerable expense. *Which costs the most*, a new bridge, a graded hill, or the waste of two-thirds of the energy and time of the majority of our citizens?

A Parking Plan.

Land for parks should be acquired before land values advance. A community may well buy and hold some outlying tracts of land approximately equidistant from the center of the community and from each other, while land still costs little, and they can be developed into parks as needed. Provision should be made for attractive streets connecting developed parks with the center of a city and with each other. These streets should be direct, broad and free from heavy commercial traffic. In a well developed community, it is not enough to have a park distinct in itself. There is a marked tendency toward a chain of parks connected by parked drives, and in eastern states several communities will coöperate in the creation of such a chain, frequently at an enormous expense. Naturally, the effect of such a system is to raise the value of adjacent real estate.

PUBLIC BUILDINGS AND GROUNDS.

The proper location of libraries, schools, city halls, fire and police stations and other buildings for public use or for community business, is important. Suitable sites for these purposes should be reserved in advance by all communities and care exercised that the buildings shall be of suitable design and the grounds adequate.

Hotels, opera houses, churches, while not of community ownership, bear such an important relation to community life and welfare that their proper location, setting and design should be under community control, as well as their proper relation to each other.

In the smaller communities, nearly all buildings of public ownership or for public use, are located near the business center. With the possible exception of hotels and opera houses, it is better that such buildings be one degree removed from the retail business street and if they can be located just off from the main business street on broad avenues that lead from the community center to parks or other points of public interest and that constitute a part of a parkway system, ideal conditions have been reached.

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Water approach to Madison, Wisconsin. No plan or forethought. (By courtesy of the Madison Park and Pleasure Drive Association.)

Water approach to Geneva, Switzerland. (By courtesy of the Madison Park and Pleasure Drive Association.)

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REGULATION OF PRIVATE DEVELOPMENT.

Building Regulations.

The reason that the business district of nearly all small communities is so unattractive, is that the buildings are cheaply constructed for immediate needs in money making and with no regard for appearance or for harmony with other bulldings on the street. There are very few merchants who do not realize the value of attractive window displays. There should be an equal ambition to make the whole business district attractive by planning buildings of substantial and pleasing construction, those in each block uniform in height as nearly as possible, and kept in good repair. In small towns often many of the business buildings are only one story in height. There are doubtless some advantages, especially if a town is so small that it requires little time or effort to travel the length of the business district, but there would be a distinct economy in erecting two story buildings of substantial structure and devoting the second stories to offices for professional men, or to other appropriate uses. This would result in greater unity and attractiveness in the business district, and a much better proportioning of the height of the buildngs to the width of the street.

There should be some regulation of the erection of business buildings in even a small community if only for the good appearance of the street. In larger communities with higher buildings, of course more rigid regulations must prevail so as to insure stability of structure, reduction of fire danger and improvement of hygienic conditions.

Building Zones.

Even the smaller communities should designate areas upon which certain classes of development can take place. Factories would be out of place in an established residence district and even in certain portions of a retail business district. The erection of one or more large apartment buildings among detached residences would result in a lack of harmony and would be a detriment to a portion of the community. If a building line beyond which no building shall extend, is established early for each street or block, the result will be a degree, at least, of harmony and unity.

The establishment of building districts or zones will do away with much of the annoyance from noises and smoke, also.

SUMMARY OF SOME IMPORTANT CONSIDERATIONS.

1. Make the main approaches to a city, sightly, especially railway stations and steamer docks.
2. Adopt such regulations as will tend to make the main thoroughfare to and through the retail business district, adequate and sightly.
3. Provide for suitable parks and sites for public buildings.
4. Water frontage is an important asset. Improve a good percentage for public use and keep the remainder sightly.
5. Arrange for adequate and beautiful streets connecting the city center with the parks or other points of public interest, and connecting parks with each other.

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6. Arrange for direct routes between important points.

7. Adopt regulations as to widths and designs of various classes of streets, including provisions for future street car lines, planting of shade trees on residence streets, disposition of lighting, telephone and telegraph wires, etc.

8. Provide for service alleys and courts through blocks in the retail business district, so that trucks standing for the delivery of merchandise freight or for the loading of merchandise for local delivery, will not impede traffic on a thoroughfare.

9. Provide for the proper relation of water and rail transportation facilities to each other and to manufacturing and mercantile enterprises, so that cost of production will not be increased by needless transfer and cartage of freight, so that there will not be increased congestion of traffic, and increased cost of street maintenance and so that the efficiency of the industries will not be crippled.

10. Try to group public buildings in a location in good relation to retail business district and to residence districts.

11. Buy and hold in reserve plenty of land well located for future schools and other public buildings, and for parks, before land values are too great.

12. Adopt a town extension plan so that future growth and development may take place without clashing of interests or clogging of the channels of circulation, or the imposition of heavy expense on the city for the purchase of land for public uses.

13. Arrange for zones within which only certain classes of development can take place, as, for example, (1) A factory zone near the transportation centers and on the side of the city from which prevailing winds do not come. This will confine smoke, noise and much heavy trucking to a restricted area. (2) Residential zones with restrictions as to building lines, height of buildings and percentage of ground that can be covered. Arrange for territory convenient to factory districts or with good transportation facilities to the factory districts, wherein homes for the factory employes can be developed at a reasonable cost.

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Street of red oaks twenty years old, at Washington, D. C. (By courtesy of John Wiley & Sons, New York, publishers of *Shade Trees in Towns and Cities*, by William Solotaroff.)

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STREET TREES.

SELECTION OF SHADE TREES FOR STREETS.

Street trees should be chosen for their form, hardiness, rapidity of growth, shade production, neatness and beauty. Do not experiment. Choose only trees that are known to thrive, get good stock, plant carefully and then see that they get good care.

Trees Recommended.

Narrow Streets
(less than 60 feet wide between building lines)
Green ash
Fraxinus lanceolata
*Hackberry
Celtis occidentalis
Pin oak
Quercus palustris
Norway maple
Acer platanoides
*Red maple
Acer rubrum

Average Streets
(60 to 90 feet wide between building lines)
Basswood, or American linden
Tilia americana
Basswood, or European linden
Tilia europaea
*Hackberry
Celtis occidentalis
Norway maple
Acer platanoides
Pin oak
Quercus palustris
*Red maple
Acer rubrum

Average Streets (continued)
Red oak
Quercus rubra
Scarlet oak
Quercus coccinea
Sugar maple
Acer saccharum
*Sycamore or Oriental plane
Platanus orientalis
White ash
Fraxinus americana

Wide Streets
(over 90 feet wide between building lines)
American or white elm
Ulmus americana
Basswood, or American linden
Tilia americana
Basswood, or European linden
Tilia europaea
Red oak
Quercus rubra
Scarlet oak
Quercus coccinea
Sugar maple
Acer saccharum
*Sycamore, or Oriental plane,
Platanus orientalis
White oak
Quercus alba

Trees Not Recommended for Street Planting.

Rapid growing trees are short-lived. Silver maple and cottonwood are good trees to plant for quick results, but they will have to be replaced at a time when other species would be at their best, as Norway maple, red oak or sycamore.

Silver maple has fragile branches, decays early and its superficial roots break up pavements. It is also subject to severe injury by the cottony maple scale. Poplars and cottonwood grow very fast and their slender habit adapts them to narrow streets but they are short-lived, they make an offensive litter on the streets in spring, and produce many root suckers. Ailanthus has a bad odor several weeks each year. The fruit of the mulberry when crushed makes sidewalks slippery and dan-

*Recommended for Southern Wisconsin only.

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Street of sugar maples thirty-five years old at East Orange, N. J. (By courtesy of John Wiley & Sons, New York, publishers of *Shade Trees in Towns and Cities*, by William Solotaroff.)

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gerous. Black locust is sure to be injured or destroyed by the locust borer. Beech grows slowly and casts too dense shade. Chestnut will develop bark disease. Walnut and hickories invite injury by their fruit. The horsechestnut on the average city street suffers from lack of water and becomes unsightly. The tulip tree has brittle wood, breaks easily in a storm and is not generally hardy. The hardy catalpa has large tender leaves that collect dust and become torn and ragged in a storm. The Carolina poplar and soft, or white maple are being removed in one city. They break easily and the roots heave up pavements and get into sewer pipes. In many eastern cities it is forbidden to plant these trees on the streets. White birch and weeping birch should never be planted, because they will surely be killed in a few years by the imported bronze birch borer, which has killed many thousands of these trees in southern Wisconsin during the past eight years.

Plant Trees That Suit Local Conditions.

The trees recommended will grow under ordinary conditions. However, if the soil is very dry, scarlet oak or hackberry should be chosen rather than white ash, white elm or Norway maple. If the soil is clay, pin oak or sycamore should do best. Of course natural conditions can be modified by changing the soil.

Selection of Stock.

Be sure to get healthy, well shaped trees. It is a waste of money and time to set the poor deformed specimens that nurserymen sometimes supply. Wild trees can be used, but they do not withstand the shock of being moved as well as trees that have been once or twice transplanted. Do not seek cheap stock; get trees from responsible nurserymen.

It is possible often to set out trees as large as 12 inches in diameter, but the cost increases much more rapidly than the size. As a rule the stems of the trees should be between 2 inches and 3 inches in diameter, and about 12 feet in height. This serves pretty well the common desire for early results at a reasonable cost.

The same species should be planted along an entire street.

TIME TO PLANT.

Early spring is the best season to plant, just after the ground thaws. Trees are then quick with new life and if moved can very promptly provide feeding organs and adapt themselves to changed conditions. If a drouth follows the planting, the trees must be freely watered until they are established.

Deciduous trees should never be transplanted while the leaves are on and midwinter is not a good time because the ground is frozen. Late fall is often preferred, yet it is never well to expose a tree to the dangers of a winter before it has had a chance to grow new roots and fix itself in the soil.

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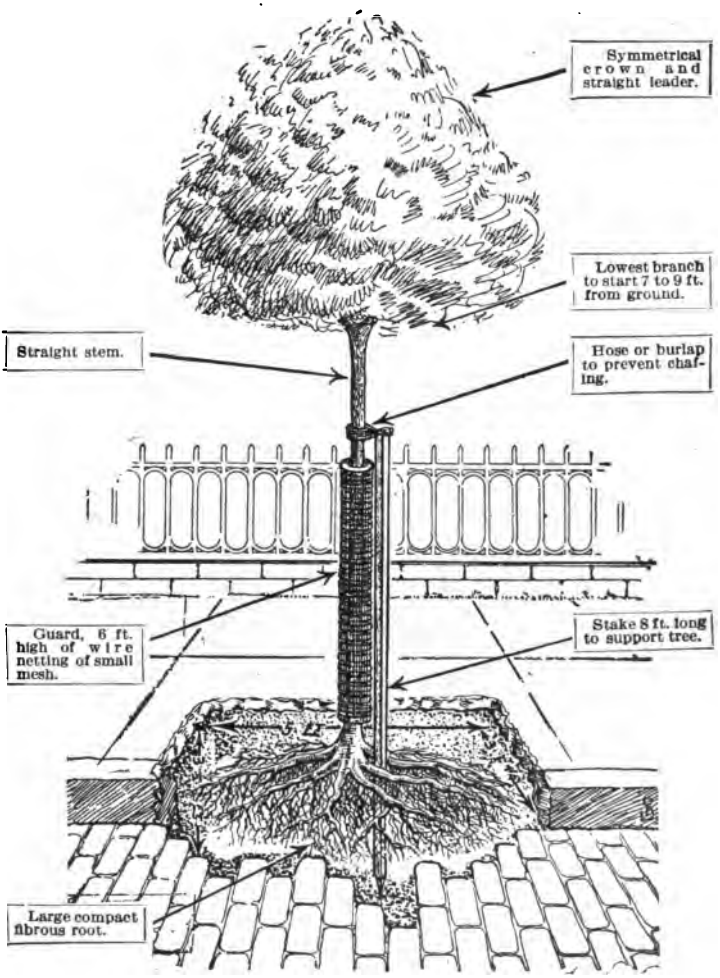
Symmetrical crown and straight leader.
Lowest branch to start 7 to 9 ft. from ground.
Straight stem.
Hose or burlap to prevent chafing.
Guard, 6 ft. high of wire netting of small mesh.
Stake 8 ft. long to support tree.
Large compact fibrous root.

Specifications for a street tree. (By courtesy of John Wiley & Sons, New York, publishers of *Studies of Trees*, by J. J. Levison.)

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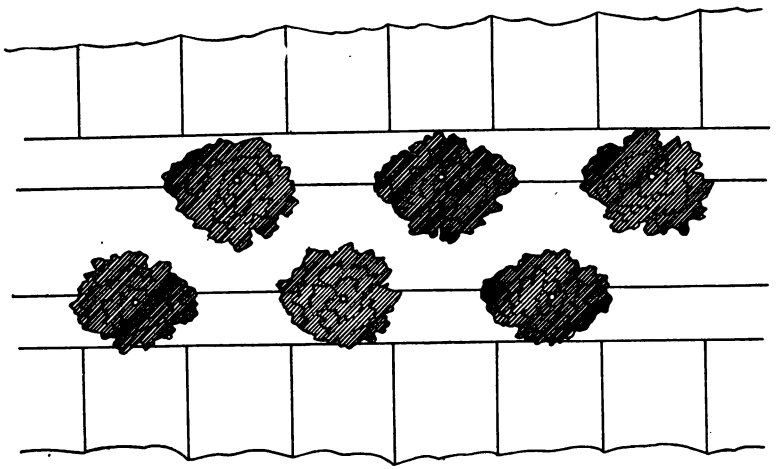
SPACING.

Trees should not be placed so close together that when grown they will interfere with each other or entirely shade the house fronts. It is possible to have too much shade. Each tree should have room to develop its own form. Forty feet, fifty feet, sixty feet and even more should be allowed between permanent shade trees, according to the size and habit of growth of the species planted and according to the width of the street. On wide streets (over 90 feet between buildings), trees should be spaced 50 feet apart and if possible they should be planted on the lawn 6 feet inside the sidewalk line. On medium streets (60 to 90 feet between buildings), the trees should be spaced 40 feet apart. On narrow streets (less than 60 feet between buildings), the shade trees should be spaced 40 feet apart and alternated instead of being placed opposite each other on the two sides of the street, as each tree then has more chance to branch out freely. However, the effort should be to develop rows or blocks of trees, rather than individual trees. Trees may be planted closely and later alternate



On narrow streets shade trees should be alternated instead of being placed opposite each other. (By courtesy of the New Jersey Forest Commission.)

ones removed. However, the tendency is not to thin them out at the proper time. In close planting, the intervals must be half or one-third the intended ultimate spacing.

As stated before, every tree should have at least 6 square feet of open earth above its roots. This is especially important where sidewalks and roadway are paved with concrete instead of brick or some other jointed material. On narrow sidewalks, the open space may have to be limited to 1½ feet by 4 feet, but an effort should be made for openings 3 x 8 feet, or better still, a continuous parking.

The spacing and setting of trees should be planned so that the corners at street intersections should be left free.

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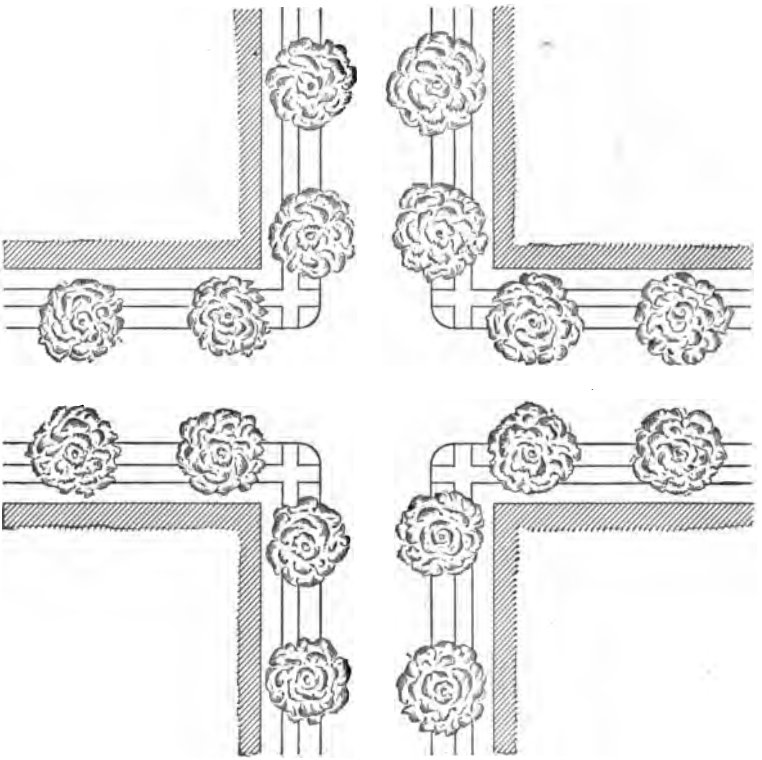
PLANTING.

Before a tree to be planted is brought on the ground, have the hole made ready for it. If the planting site is on "made" ground, take out at least a cubic yard of the rubbish and provide as much good loam. Then prepare the planting hole, by digging or by filling, as the case may be, so that it will be somewhat larger than the root area and about a foot deeper than the roots. On the bottom spread a layer of fine, mellow, fertile soil. Have the space above this bed just deep enough to accommodate the roots and allow the tree to stand about 2 inches deeper than it did in the nursery—not more.



The disposition of trees at street intersections. (By courtesy of John Wiley & Sons, New York, publishers of *Shade Trees in Towns and Cities*, by William Solotaroff.)

Move a tree with as many roots as possible. It may grow if only the stubs of the main roots are saved; it will do much better if the whole root work within a radius of 2 feet is taken; give especial care to the finer rootlets, they are the ones that do the feeding. Never let them get dry, for a dry root is dead.

Preserve the normal crown, or the form developed in the nursery, if possible. If the root system has been much curtailed, it will be neces-

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European Larch. (By courtesy of the Conservation Commission of New York.)

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sary to cut back the crown to maintain a balance between roots and foliage; yet this balance is much better kept by saving roots than by sacrificing branches. Good trees rarely come from the bean poles that are often planted. The lower branches of a street tree should be not less than 10 feet above the sidewalk. While it is small something less may be allowed, but sufficient headroom should always be given passers-by. If this is not done the tree is sure to be injured. Observe how the branches bend when heavy with rain and then allow plenty of room for umbrellas.

If possible, always transplant a tree on a cloudy day. A bright sun quickly exhausts the stored up moisture. But whenever the tree arrives, get it into the ground without delay. If a large number of trees are to be handled, have a trench ready, place the trees in a row, not upright, but at such a slant that the crowns will not lie on the ground, and cover the roots with dirt until the trees can be set. Thoroughly wet the earth in the hole that has been prepared, set in the tree and spread out the roots so that they lie naturally and are not crossed. Cut off with a sharp knife all that are broken or badly bruised. A mutilated root invites decay. Then fill in with finely pulverized earth, work it under and around the roots by hand, and compact it firmly. Do not let any manure come in contact with the roots. If the earth is wetted down as it is put in, it will make a much better contact. Fill the hole to the ground level when well compacted, then rake over the surface and pulverize it to a depth of about an inch. Never use any but well-rotted manure in planting trees and put it on the top soil above the tree roots. Two points are very important: Keep the tree vertical and be sure that all the roots are well embedded. It is possible to injure the roots by making the earth about them too hard, yet more trees are lost through faulty root bedding than in any other way. Remember that a tree feeds by its roots; to do that, every smallest rootlet must be firmly *in* the soil.

When planted, tie the tree to a strongly set stake, or place the guard about it at once.

CARE OF TREES.

City streets are by no means the ideal environment for trees and proper care should be given to street trees. Young trees should be watered when necessary. They grow better when given plenty of water. Young trees should be supported and protected from horse-biting, wheel-scraping, etc., by metal or wooden guards.

No tree should be set where there is not six square feet of open earth at its base. In Washington, D. C., the regulation openings are 3 feet by 8 feet, or 24 square feet. A generous space of earth about a tree is absolutely necessary for its health. Moreover, while a tree is young, the soil in this opening should be stirred frequently to admit air and control evaporation; after a tree grows to good size, grass may be allowed to cover the opening, although constant cultivation stimulates growth.

If it becomes necessary to extend pavements up around trees, iron gratings can be set in openings in the pavement around the trees. They entail considerable expense and must be raised to clean out the spaces, but they are valuable in some cases.

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Shagbark Hickory. (By courtesy of the Conservation Commission of New York.)

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Trees should be watched for any signs of insect or fungous injury and sprayed if necessary.

Water.

In summer, if rain does not fall for several weeks, trees should have water, for pavement, sidewalks and house fronts become so heated that the evaporation from the leaves is greatly increased. A thorough saturation of the soil every week or ten days is better than more frequent sprinkling. At a dry time, it is a good plan to build an earth dam about the tree, three or four feet from its base, or as near that as the pavement will permit, and fill the hollow with water, several times if necessary. When the water has all been absorbed and the top soil is dry, break down the dam and spread the pulverized earth over the wetted area. This will retard evaporation. Do not water so frequently that the earth becomes soggy and sour.

Under some circumstances it may be necessary to provide tile pipes to properly water trees. The tile pipes should be laid only in ground that has settled. From four to six pipes three inches in diameter should be used for each tree, being laid about a foot or a foot and a half in the ground, with open joints, and at a distance of four to eight feet from the trees. There should be a layer of broken stone or coarse gravel separating the pipes from the soil to prevent clogging the joints. A branch pipe set vertically connects the horizontal tiles with the surface and affords entrance to water. An iron cap should protect the opening of the vertical pipe. A single row of tile pipes can be used, or a double row, or a complete rectangle can be laid around each tree. Liquid fertilizer can be supplied through the pipes as well as water.

Fertilizers.

Trees must have food, as well as air and water. More street trees suffer from starvation than from any other cause. On city streets all leaf litter is gathered up and removed. *Therefore, in spring a little well-rotted stable manure should be spread around trees and worked into the soil with a rake or fork, or it can be heaped about the tree over winter and removed in the spring. If the exposed manure is objectionable, substitute a commercial fertilizer as follows:

For Light Soils. Mix equal weights of nitrate of soda, acid phosphate, muriate of potash, and ground bone. Apply in spring at the rate of from 1 to 1½ pounds of the mixture to 100 square feet of exposed soil. This equals from 1½ to 2 ounces for a tree with a footing of 8 square feet.

For Heavy Clay Soils. Mix 2 parts of nitrate of soda, 3 parts acid phosphate, 1 part muriate of potash, 2 parts bone meal. Apply at the same rate as the above.

In either case distribute the fertilizer evenly and mix it thoroughly with the soil. Be careful not to use too much, else the tree roots may be burned. Where it is inadvisable to break the sod or to work the soil, make holes about 6 inches deep and 2 or 3 feet apart beneath the tree, with a crowbar, and fill them with this mixture.

*Credit is due the New Jersey Forest Commission for these suggestions and formulae, which appeared in "The Planting and Care of Shade Trees."

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The task of properly nourishing a tree is not so simple as these instructions would seem to make it, but more specific directions cannot be given without a knowledge of the natural soil and the kind of trees. If a tree shows thin foliage, slender branches, and dead tops, it is starving, and will die unless nourishment is given.

INSECT AND FUNGOUS INJURIES.

No dead parts of a tree or exposed wounds should remain without treatment, as they afford entrance for disease. Sometimes a tree is hopelessly injured before it is known that the tree has been attacked. It is rare that a healthy, vigorous tree has fungous trouble. If a tree is injured, the torn parts should be trimmed and an immediate application of coal tar, asphaltum or heavy white lead be given. Prevention is far easier than cure.

Fungi.*

Fungi may attack tree foliage, and this is not necessarily serious. Other fungi attack twigs and branches; other kinds attack sapwood and still others, the heart wood.

Remedies are called fungicides, which are sprayed or painted on the trees.

Bordeaux Mixture.

The best fungicide is known as the Bordeaux mixture. It consists of:

5 lbs. of copper sulphate ($Cu\ S\ O_4$) dissolved in hot water.
5 lbs. of fresh quicklime, freshly and slowly slaked.
The quicklime should be passed through a fine wire strainer and diluted by gradually adding a gallon of water. It must be in the form of a creamy liquid, free from grit. The two liquid mixtures are now diluted with 24 gallons of water each and slowly mixed by pouring simultaneously into a 50 gallon cask (no metal vessels can be used).

If an insecticide also is wanted, add 5 ounces of Paris green.

In general, then, to protect trees from attacks of fungi, use preventive measures first, by keeping trees free from dead parts and exposed wounds. If fungi gain a foothold, remove the diseased portions as well as possible and then use the Bordeaux mixture frequently to keep the infection under control.

Insects.

There are three classes of insects that damage trees: Biting insects, sucking insects and wood-boring insects. The life of many insects has 4 distinct stages; first, the egg; second, the grub or larva; third, the dormant "cocoon" or chrysalis stage; fourth, the adult stage. Most insects can be successfully fought during the first or second stage, or both.

*Much of the material given here on fungus and insect injuries to trees, and their remedies and also references to books on that subject, is reproduced through the courtesy of the New York Conservation Commission, from Bulletin 7 on "Shade Trees."

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Street Trees in Need of Pruning. (By courtesy of John Wiley & Sons, New York, publishers of *Shade Trees in Towns and Cities*, by William Solotaroff.)

Street Trees Under Private Control, Madison, Wisconsin. (By courtesy of the Madison Park and Pleasure Drive Association.)

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Many insects after hatching from the egg, pass through successive larval or nymphal stages to the adult form, without a "cocoon" or chrysalis condition. Aphis, squash bugs and scale insects are examples of this group, which is composed largely of sucking insects.

BITING INSECTS.

These insects eat the leaves and are easily discovered in the second stage of their growth, from the partially eaten leaves. As soon as the foliage shows that insects are at work, the tree should be sprayed with a solution of Paris green or arsenate of lead. The spraying should be carefully and thoroughly done and should reach the side of the leaf on which the insects are working, usually the underside.

Paris Green Solution. 1 lb. of Paris green with 100 to 300 gallons of water. The strength of this solution should depend on the insects to be fought. 1 lb. of milk of lime should be added to prevent injury to the foliage.

Arsenate of Lead Solution. 4 lbs. of arsenate of lead paste or 2 lbs. of powder to a barrel of water is the usual strength.

Some kinds of insects lay their eggs in certain definite places and it is often possible to attack the insects at this stage by creosoting the egg masses. Many insects lay their eggs in refuse on the ground and burning this refuse will accomplish much good. Stone walls and rail fences are favorite places for the eggs of some species and these should be carefully inspected.

Creosote Mixture. 5 pints of creosote, 2 pints carbolic acid, 2 pints turpentine, 1 pint crude coal tar.

The third stage, when the insect is in the cocoon, often gives a chance for destruction. The fall web worm makes very noticeable nests. These nests can be cut off and destroyed.

Some insects must crawl up the tree to the food supply or to lay eggs. In such cases a band of cotton batting, with a band of tanglefoot paper or of tree tanglefoot is very efficient. The caterpillars collecting below this band should be gathered and destroyed from time to time.

SUCKING INSECTS.

Aphids and scale insects comprise the major portion of this important group. The best protection from such insects is a careful spraying with kerosene emulsion. In using the emulsion on a young tree, take care not to put on so much that it soaks the ground beneath the tree, or the roots may be smothered. Whitewashing the tree undoubtedly does much good, not by killing the insects, but by keeping them away. A solution of tobacco or lime and sulphur is often used to rid the trees of these pests.

Kerosene Emulsion. ½ lb. whale oil soap or common white soap to 1 gal. boiling soft water and added, while still boiling hot, 2 gals. of kerosene. The mixture should be stirred violently until it has the consistency of thick cream. The emulsion is diluted by adding 10 to 12 parts of water for soft bodied insects and 6 to 9 parts for hard bodied insects.

Tobacco Solution. 1 lb. of tobacco steeped for 2 or 3 hours in 1 gal. of water and then diluted with 3 to 4 parts of water. Better results can be

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secured with the commercial nicotine sulphate solutions (40 per cent nicotine). These can be diluted 1 part to 800 or 1000 parts of soapy water, for spraying of aphis, and without danger to foliage.

Lime Sulphur Wash. Use commercial lime sulphur and dilute according to directions on label.

The cottony maple scale has been infesting trees in Wisconsin of late. It is not ordinarily a serious trouble and is usually kept in check by its natural enemies.

*The impregnated female winters as a brown scale on the twigs, resumes feeding in May, and late in that month or in early June begins to exude a white cottony mass in which a thousand eggs or more are laid. The minute young hatch in late June or early July, crawl about a few hours and then set on leaves, twigs and branches and suck the juices. When the insects are abundant, the leaves turn a sickly yellow, often become covered with honey dew, and badly infested branches may die. In autumn the half-grown larvae leave the leaves and return to the twigs. A spray of 15–20% kerosene emulsion or scalecide when the tree is dormant, is the best treatment.

Where twigs are observed with forming white cottony masses in June and are easily accessible, it is well to cut them off and destroy them by fire and this may be all that is necessary. However, if the trees are badly infested, cut off an infested twig in late June and lay it in a box on a sheet of white paper. When the paper becomes covered with rusty, crawling dustlike particles, the young are hatching; then spray the infested portions of the tree with kerosene emulsion, using 1 part to 12 parts of water, or with whale-oil soapsuds, 1 lb. in from 2 to 4 gallons of water. A good deal can be accomplished by washing the scale from the trees with a strong stream of water from a hose. A city fire department, in its idle moments, might well engage in this work where it is greatly needed.

BORING INSECTS.

These insects consist of round and flat-headed borers, bark beetles, etc. They are very hard to deal with, as practically all of their life is spent in the tree and they cannot be exposed without killing the tree. In the case of some borers, the egg is laid on the bark, and on hatching, the grub starts boring for the woody parts. In the case of such insects, a spraying of kerosene emulsion is very good, if applied at an exact time in the development of the larvae.

Borers show where they are working by small piles of sawdust. From this sawdust the hole may be found and by injecting carbon bisulphide (a common stock chemical in every drug store) into the hole and then plugging it with grafting wax or hard soap, or clay, the insect will be killed. Such treatment is well worth while in the case of the maple borer, where three or four insects may practically ruin the tree.

The bark beetles are the hardest to attack and often do a great amount of damage. They do not usually attack any but weakened trees. When bark beetles are found in a tree, about the only thing to do is to cut them out, or to remove and *burn* the tree in *winter* or *early spring* to protect adjacent trees.

*By courtesy of New Jersey Forest Commission in "The Planting and Care of Shade Trees."

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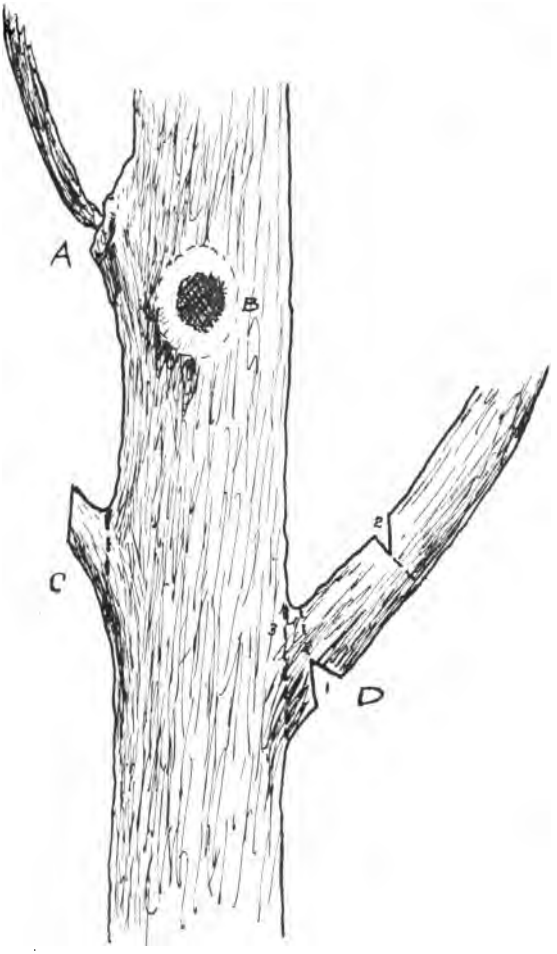
TREE SURGERY.*

Pruning.

Pruning is, of course, the most common form of tree surgery. Street and park trees are altogether too valuable to be subjected to pruning at the hands of any but an experienced man. Get a good man to do



A—Dead Stub.
B—Wound or Limb Scar Not Closing.
C—Showing Improper Pruning. Should have been cut on dotted line.
D—Shows cuts necessary to successfully remove large branch.
Notch cut at 1 first, notch and saw cut at 2 next, then saw cut at 1, and last saw cut at 3.
(By courtesy of the Conservation Commission of New York.)

pruning. Careless work leaves torn places and rotten stubs, which become starting points for disease.

*An excellent pamphlet for reference is Practical Tree Surgery by J. Franklin Collins, published by the U. S. Department of Agriculture, Washington, D. C., as Y. B. Separate 622.

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Pruning is done to influence the size and form of a tree, to secure better flowering or fruiting conditions, to get rid of diseases, of insects or of other injuries, or to increase the vigor of the remaining parts. In general, it is better to remove small branches annually than to cut off large ones after a period of years.

Late autumn or early spring is considered the best time to prune all species except those that bleed badly, as maples and birches. These species should be pruned in winter.

The main considerations in pruning are to remove branches in such a way that there will be no injury to the tree, and to sterilize and waterproof the wounds.

In pruning a tree, all dead and dying branches should be removed first, being cut off back to the living wood. Use a saw wherever possible, except on very small branches, and it is exceedingly important to make all cuts as close as possible to the bole or main branches of a tree. *Never leave any stubs.* The greatest care should be exercised to prevent splitting or tearing the tree when removing larger branches. A good way to remove a large branch is to make a notch on the under side of the branch near to the tree, and this notch should extend about half way through. Then cut off the branch 6 or 8 inches beyond the notch, so that if the branch breaks down, it splits into the notch instead of splitting away from the tree or tearing the bark from the trunk. The weight of the branch now having been removed, the stub can be cut off close to the tree; or if the stub is still heavy, it can be removed in two pieces, the first cut being made on the line of the notch, the next close to the tree.

All cuts that are more than 3 inches in diameter should be painted over with a mixture of asphaltum and carbolineum, 1 part of the former to 3 parts of the latter. Asphaltum and asphaltum mixtures are excellent to use in pruning trees and filling tree cavities. For large wounds, nothing is better, but the fact that asphaltum has to be kept melted, and applied when hot, makes it somewhat less convenient to use than other coatings that will keep the spores of fungi from getting a start. Heavy white lead paint, grafting wax or coal tar creosote can be used. Paint usually looks better and if the surface of the first coat shows signs of breaking, a second or third coat should be applied. A coating of asphaltum, properly applied, often lasts for years.

Removing Decayed Wood.

Removing decayed wood from tree trunks and filling the cavities with cement, is another practice in tree surgery. This cannot be recommended in the case of large holes in over-mature trees. It is almost impossible to remove all the decayed wood, and filling is of no avail unless this can be done. Moreover, it is hardly worth while to prolong the existence of trees in such a condition.

However, smaller openings can be completely cleaned of dead matter, washed with a fungicide (copper sulphate solution), painted with heavy paint and filled with cement. A tree will ordinarily recover from such a wound very quickly, and the bark tends to grow over the filled opening.

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1. The branch. 2. Start with an undercut, saw half way. 3. Then saw close to the shoulder, about half way. 4. Saw above undercut, branch will drop off. 5. Remove stub. 6. Work is done.

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Bolting Broken Branches.

Sometimes large branches can be saved after they have been partially split away from the tree trunk. The wound should be washed with Bordeaux mixture and the margins covered with white lead paint. Neither tree nor branch should be surrounded with a metal band, which would ultimately girdle the tree. Nor should the branch be bolted to the tree trunk. A hole should be bored through the branch and through the trunk, at right angles to the split. A bolt should be run through the branch with head and washer on the lower side and be fastened with a cable or a chain to a similar bolt through the main trunk. This gives support without interfering with the growth of the tree and without holding the branch so rigidly that the wind may cause it to break beyond the original split.

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Tenney Park, Madison, Wisconsin, made from Waste Marsh Land. (By courtesy Madison Park and Pleasure Drive Association.)

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PARKS.

Necessity of Parks.

Fortunately it is no longer necessary to defend the creation of parks. Their influence on the health, the beauty and even the morality of a community, is well recognized. Small communities containing detached houses on good sized building lots may not feel the same need of a park that larger communities do, and yet even in the small towns there are public out-of-door fetes, holidays are publicly celebrated, and public ground is needed at these times. Moreover, the best ground in each community should be reserved for the community.

City and Suburban Parks.

In the more densely populated portions of a city, even one public square maintained as a shaded lawn offers a refuge from the rush and noise and nerve strain of city life. Formal treatment is suitable on such an area, closely surrounded by buildings and architectural lines.

Larger areas well distributed over a city will be visited by crowds on every possible occasion. These essentially city parks should be maintained as lawn with ample shade and attractive shrubs and flowers. Open, grass covered areas offer the repose of spirit that city dwellers need, besides accommodating larger crowds than woodland areas of the same size.

Woodland areas are more stimulating in their effect, and rarely can a city spare much of its ground for wild forest growth. Therefore, woodland parks are often better developed just outside a city or on very rough ground, where the space can well be spared.

Selection of Parks.

If a community can select its parks it is fortunate indeed, as the location must ordinarily be influenced by the cost of land, the tracts that are easily available, or by gifts that may be made.

The highest ground in a community is usually the most desirable and water frontage is always desirable. The long views from high ground or lake shore draw people to these points and demonstrate the desirability of the sites. If a community is level and there is no particularly desirable ground within a large area, there might be a long parkway between two streets, thus giving the effect of a very wide parked street and at the same time making the park easily accessible throughout a long district. With skilful planning, however, very beautiful parks can be made from waste or marshlands.

Preliminary Plan.

A community park created for all time is a very important undertaking. To save time and expense it should be started right. An expert landscape architect should be employed, even if the initial expense seems large. It takes many years to grow fine trees, and valuable time should not be

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Tenney Park, Madison, Wisconsin, made from Waste Marsh Land. (By courtesy of the Madison Park and Pleasure Drive Association.)

A Bridge of Good Design on Yahara Parkway near Madison, Wisconsin. Building a bridge offers a great opportunity for introducing a pleasing feature into the landscape. The majority of bridges, however, are objectionable in design. (By courtesy of the Madison Park and Pleasure Drive Association.)

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wasted in experiment. An expert, with one glance, can see the possibilities offered by the natural topography of the site, by vegetation already there, and can secure much more satisfactory results without the loss that would come from having to undo the work later. It is an expensive mistake to employ a contractor to do the work of an architect, a gardener to do the work of a landscape artist, or an engineer to do the work of an artist. Each one has his place, but no one of them should try to do the work of another. Parks should always be developed upon a preliminary plan made by an expert. A tendency to over-crowding with plants should be avoided.

Planting.

The preliminary plan will determine to a large extent the character of the planting. It is within the scope of the work of the Conservation Commission to indicate the kinds of trees that are adapted to Wisconsin climate and conditions and to give their general characteristics.

However, this information is not a substitute for a preliminary planting plan.

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A Strip of Drive Before and After Planting. (By courtesy of the Madison Park and Pleasure Divre Association.

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TREES FOR GENERAL PLANTING.

The following trees are recommended as well suited to Wisconsin conditions; however, those marked with an asterisk (*) are recommended for southern Wisconsin only.

Deciduous Trees.

American elm
Ulmus americana
Bechtel's crab
Pyrus ioensis var. *Bechtelii*
Black birch
Betula lenta
Black cherry
Prunus serotina
*Black walnut
Juglans nigra
Blue beech or Water beech
Carpinus caroliniana
Box elder or Ash-leaved maple
Acer negundo
Bur oak
Quercus macrocarpa
*Butternut
Juglans cinerea
Flowering crab
Pyrus floribunda
Ginkgo
Ginkgo biloba
Green ash
Fraxinus lanceolata
Hackberry
Celtis occidentalis
Honey locust
Gleditsia triacanthos
Hop hornbeam or Ironwood
Ostrya virginiana
*Horse chestnut
Aesculus hippocastanum
*Juneberry
Amelanchier canadensis
*Kentucky coffee tree
Gymnocladus dioicus
Larch
Larix europaea
Linden or Basswood
Tilia americana
Tilia europaea
Mountain ash
Pyrus americana
Norway maple
Acer platanoides
Paper birch
Betula papyrifera
Paul's double scarlet thorn
Crataegus oxyacantha
Pignut hickory
Carya glabra
Pin or Swamp oak
Quercus palustris
Red or River birch
Betula nigra
Red or Scarlet maple
Acer rubrum
Red oak
Quercus rubra
*Russian mulberry
Morus alba
*Sassafras
Sassafras sassafras
Scarlet oak
Quercus coccinea
Shagbark hickory
Carya ovata
Silver maple
Acer saccharinum
Sugar maple
Acer saccharum
*Sycamore or Oriental plane
Platanus occidentalis
*Sycamore maple
Acer pseudoplatanus
Tartarian maple
Acer tataricum
Tree lilac
Syringa japonica
Trembling aspen
Populus tremuloides
*Tulip tree
Liriodendron tulipifera
Weeping willow
Salix babylonica
White ash
Fraxinus americana
White hickory
Carya alba
White oak
Quercus alba

*Recommended for Southern Wisconsin only.

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Evergreens.

For lawns

American arbor vitae
Thuya occidentalis
Colorado blue spruce
Picea pungens
Fraser's fir
Abies fraseri
Norway spruce
Picea excelsa
Silver fir
Abies concolor
Swiss mountain pine
Pinus montana
White pine
Pinus strobus
White spruce
Picea canadensis

For pruned hedges

American arbor vitae
Thuya occidentalis
Hemlock
Tsuga canadensis
Norway spruce
Picea excelsa

For windbreaks

Austrian pine
Pinus austriaca
Norway spruce
Picea excelsa
Scotch pine
Pinus sylvestris
White pine
Pinus strobus
White spruce
Picea canadensis

NOTE.—Red cedar is omitted from this list, as it is the alternate host for a rust which damages apple trees.

Trees Classified According to their Form or Effect.*
Good single or specimen trees.

Formal (Symmetrical in outline.)

Deciduous (50 to 100 feet)	Evergreen (50 to 100 feet)
Basswood or American linden *Tilia americana*	Austrian pine *Pinus austriaca*
Basswood or European linden *Tilia europaea*	Norway spruce *Picea excelsa*
Bur oak *Quercus macrocarpa*	White pine *Pinus strobus*
European beech *Fagus sylvatica*	
Horse chestnut *Aesculus hippocastanum*	
Norway maple *Acer platanoides*	
White oak *Quercus alba*	

Deciduous (Trees and shrubs) (10 to 20 feet)	Evergreen (10 to 20 feet)
Bechtel's crab *Pyrus ioensis* var. *Bechtelii*	Colorado blue spruce *Picea pungens*
Black haw *Viburnum prunifolium*	Swiss mountain pine *Pinus montana*
Paul's double scarlet thorn *Crataegus oxyacantha*	
Tree lilac *Syringa japonica*	

*Credit is due R. W. Curtis, joint author with E. G. Davis of "The Home Grounds," Bull. 361 of the Cornell University Agricultural Experiment Station for the suggestion of this method of classifying trees.

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Graceful.

Deciduous (50 to 100 feet)	Evergreen (50 to 100 feet)
American elm *Ulmus americana* Hackberry *Celtis occidentalis* Sugar maple *Acer saccharum* Sycamore *Platanus orientalis*	Hemlock *Tsuga canadensis* White pine *Pinus strobus*
(10 to 30 feet)	(10 to 30 feet)
Flowering crab *Pyrus floribunda* Russian olive *Elaeagnus angustifolia* Beautiful waxy white foliage and absolutely hardy Tartarian maple *Acer tataricum* Washington thorn *Crataegus cordata*	Arbor vitae or White cedar *Thuya occidentalis*

Gingko Trees. (By courtesy of John Wiley & Sons, New York, publishers of *Studies of Trees*, by J. J. Levison.)

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Picturesque (Striking in form or color)

Deciduous (50 to 100 feet)	Evergreen (50 to 100 feet)
Black oak *Quercus velutina*	Austrian pine *Pinus austriaca*
Bur oak *Quercus macrocarpa*	Red or Norway pine *Pinus resinosa*
Red oak *Quercus rubra*	Scotch pine *Pinus sylvestris*
Red or River birch *Betula nigra*	White pine *Pinus strobus*
Shagbark hickory *Carya ovata*	
Trembling aspen *Populus tremuloides*	
(10 to 30 feet)	
Alternate-leaved dogwood *Cornus alternifolia*	
Cockspur thorn *Crataegus crus-galli*	
Russian or Wild olive or Oleaster *Eleagnus angustifolia*	

Conical (for emphasis)

Deciduous (50 to 100 feet)	Evergreen (50 to 100 feet)
Larch *Larix europaea*	Colorado blue spruce *Picea pungens*
Pin oak *Quercus palustris*	Fraser's fir *Abies fraseri*
	Norway spruce *Picea excelsa*
	Silver fir *Abies concolor*
	White spruce *Picea canadensis*
	(20 to 30 feet)
	White cedar or Arbor vitae *Thuya occidentalis*

Vertical.

Deciduous (50 to 100 feet)	Evergreen (to 30 feet)
Upright sugar maple *Acer saccharum* var. *monumentale*	Irish juniper *Juniperus communis* var. *hibernica*
White hickory *Carya alba*	White cedar or Arbor vitae *Thuya occidentalis*

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Mass Planting.

Deciduous (50 to 100 feet)	Evergreen (50 to 100 feet)
Basswood or American linden *Tilia Americana*	Hemlock *Tsuga canadensis*
Basswood or European linden *Tilia Europaea*	Red or Norway pine *Pinus resinosa*
Black birch *Betula lenta*	White pine *Pinus strobus*
Red maple *Acer rubrum*	
Red oak *Quercus rubra*	
Red or River birch *Betula nigra*	
Scarlet oak *Quercus coccinea*	
Shagbark hickory *Carya ovata*	
Sugar maple *Acer saccharum*	
White ash *Fraxinus americana*	
White oak *Quercus alba*	

(15 to 30 feet) Trees and Shrubs	(15 to 30 feet)
Ironwoods and Hornbeams *Ostrya* and *Carpinus*	White cedar or Arbor vitae *Thuya occidentalis* (Will not live in shade)
Juneberries or Shadbushes *Amelanchier laevis* and *A. canadensis*	
Nannyberry *Viburnum lentago*	
Speckled alder *Alnus incana*, best in wet soil	
Thorn *Crataegus*	
Witch-hazel *Hamamelis virginiana*	

Rapid-Growing Trees.

As a rule, rapid-growing trees are not desirable except for temporary effects. Birches, poplars, willows, soft maple, ailanthus and wild black cherry grow rapidly. The cherry is the most durable of these, and ailanthus and soft maple come next. Ailanthus is a vile-smelling tree and multiplies from its roots and becomes a pest. Soft maple is undesirable on account of cottony maple scale.

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SHRUBS FOR GENERAL PLANTING.

The planting of native shrubs is strongly recommended. They are hardy, beautiful, and do not require a great amount of attention. Of course many of the* ornamental shrubs, too, have great merit and are hardy but the greatest beauty is frequently in the blossoms, which endure only a small part of the year. Some ornamental shrubs will grow well in Wisconsin but will not blossom well unless they are given winter protection.

Lists are given below of native and ornamental shrubs that are recommended. In southern Wisconsin and in localities on the shores of the Great Lakes, some other varieties can be grown, but the lists appended contain a large number of excellent shrubs that are hardy.

Native Shrubs.

Height, 10—15 feet.

Arrowwood
Viburnum dentatum

Black haw
Viburnum prunifolium

Buckthorn
Rhamnus cathartica

Burning bush or Wahoo
Euonymus atropurpureus

Bush cranberry,
Viburnum opulus

Dogwood, Round-leaved
Cornus circinata

Dogwood, Silky
Cornus sibirica

Elder, Common or Black
Sambucus canadensis

Elder, Scarlet
Sambucus pubens

Nannyberry or Sheepberry
Viburnum lentago

Prickly ash
Zanthoxylum americanum

Speckled alder
Alnus incana

Sumac, Smooth
Rhus glabra
Will not endure much shade.

Sumac, Staghorn
Rhus typhina
Will not endure much shade.

Thorn, Cockspur or Newcastle
Crataegus crus-galli

Winterberry or Holly
Ilex verticillata
Plants are dioecious (of separate sexes) and fruiting plants must be selected.

Witch-hazel
Hamamelis virginiana

Height, 6—10 feet.

Blackberry
Rubus allegheniensis

Bladder nut
Staphylea trifolia

Chokeberry, Black
Aronia nigra

Dogwood, Panicled
Cornus paniculata

Dogwood, Red osier
Cornus stolonifera

Hazelnut
Corylus americana
Corylus rostrata

Ninebark
Physocarpus opulifolius

Raspberry, Black
Rubus occidentalis

Raspberry, Purple-flowered
Rubus odoratus

Raspberry, White-flowered
Rubus nutkanis

Raspberry, Wild
Rubus strigosus

Red elderberry
Sambucus racemosa

Shepherdia
Shepherdia canadensis

Sumac, Dwarf or Shining
Rhus copallina
Will not endure much shade.

Wild rose, tall
Rosa lucida
Will not endure much shade. All wild roses should be cut down every three or four years.

Withe-rod
Viburnum cassinoides

*The term "ornamental shrubs" include introduced shrubs and horticultural varieties.

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Native Shrubs (continued)

Height, to 6 feet.

Bearberry
Arctostaphylos uva-ursi
Buttonbush
Cephalanthus occidentalis
Common juniper
Juniperus communis
Coralberry or Indian currant
Symphoricarpus vulgaris
Downy arrowwood
Viburnum pubescens
Fragrant sumac
Rhus canadensis
Gooseberry
Ribes oxycanthoides
Ground hemlock
Taxus baccata
Grows best in shade.
Leatherwood or Wickopy
Dirca palustris
Maple-leaved viburnum or Dockmackie
Viburnum acerifolium
Meadow sweet
Spirea salicifolia
New Jersey tea
Ceanothus americanus
Sand or Dwarf cherry
Prunus pumila
Will not endure much shade.
Snowberry
Symphoricarpus racemosus
St. John's wort
Hypericum prolificum
Sweet gale
Myrica gale
Sweet fern
Myrica asplenifolia [*Comptonia*]
Trailing juniper
Juniperus procumbens
Wild black currant
Ribes floridum
Wild rose currant
Ribes rubrum
Wild rose, dwarf
Rosa blanda
Wild rose, swamp
Rosa carolina
Wild rose
Rosa lucida
Rosa nitida

Ornamental Shrubs for Wisconsin.

Height, 10 to 15 feet.

Common lilac
Syringa vulgaris
Golden elder
Sambucus nigra var. *aurea*
Hazel
Corylus avellana, and *Corylus maxima* var. *purpurea*
Irish juniper
Juniperus communis var. *hibernica*
Jossika's lilac
Syringa josikaea
Mock orange
Philadelphus coronarius
Purple-leaved barberry
Berberis vulgaris var. *atropurpurea*
Rouen lilac
Syringa chinensis [*S. rothomagensis*]
Tartarian or Bush honeysuckle
Lonicera tatarica
Thorn, or American hawthorn
Crataegus coccinea
Thornapple, or Washington thorn
Crataegus cordata
Wayfaring tree
Viburnum lantana

Height, 6 to 10 feet.

Blue honeysuckle
Lonicera caerulea
Chinese lilac
Syringa villosa
Common barberry
Berberis vulgaris
Five-leaved aralia
Aralia pentaphylla
Acanthopanax pentaphyllum
Golden flowering currant
Ribes aureum
Ground hemlock or Native yew
Taxus canadensis
Honeysuckle, Fragrant
Lonicera fragrantissima
Purple filbert or Hazel
Corylus maxima var. *purpurea*
Rose acacia
Robinia hispida
Rose, Rambler
Rosa multiflora
Rose, Sweetbrier
Rosa rubiginosa
Siberian pea tree, dwarf
Caragana frutescens
Silver berry
Eleagnus argenta

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Ornamental Shrubs for Wisconsin (continued)

Height 6 to 10 feet

Honeysuckle, Morrow's
Lonicera Morrowi
Japanese rose
Rosa rugosa
Japanese yew
Taxus cuspidata
Spiraea, Douglas
Spiraea Douglasii
Spiraea, Three-lobed
Spiraea trilobata
Spiraea, Van Houtte's
Spiraea Van Houttei
Strawberry tree
Euonymus europaeus
Spiraea
Spiraea bracteata or *S. rotundifolia*
Spiraea billardi
Spiraea billardii
Spiraea, Bridal wreath
Spiraea prunifolia var. *flore pleno*
Syringa
Philadelphus inodorus
Weeping mulberry
Morus alba var.
Weigela
Diervilla hybrida
Viburnum, Red-berried
Viburnum Wrightii

Height, 2 to 6 feet.

Albert's honeysuckle
Lonicera albertii
Alpine buckthorn
Rhamnus alpina
Andromeda
Andromeda [= *Pieris*] *floribunda*
English yew
Taxus baccata var. *repandens*
Hydrangea
Hydrangea paniculata gr.
Inkberry
Ilex glabra
Japanese or Thunberg's barberry
Berberis Thunbergii
Kerria, White
Rhodotypos kerrioides
Spiraea, Anthony Waterer
Spiraea bumalda var.
Spiraea, Bumalda
Spiraea Bumalda
Spiraea, Japanese
Spiraea japonica
Syringa, Dwarf
Philadelphus coronarius var. *nanus*

Shrubs Classified According to Effect or Uses.

Shrubs for Foliage, Deciduous.

Height, 10 to 15 feet (this list includes some of the smaller trees).

Arrowwood
Viburnum dentatum
Black haw
Viburnum prunifolium
Buckthorn
Rhamnus cathartica
Bush honeysuckle or Tartarian
Lonicera tatarica
Common lilac
Syringa vulgaris
Hazel
Corylus avellana
Hazel or Purple filbert
Corylus maxima var. *purpurea*
Highbush cranberry
Viburnum opulus
Nannyberry
Viburnum lentago
Rouen lilac
Syringa chinensis [—*S. rothomagensis*]
Russian olive
Eleagnus angustifolia
Smooth sumac
Rhus glabra
Staghorn sumac
Rhus typhina [—*R. hirta*]
Thorn, or American hawthorn
Crataegus coccinea
Thornapple or Washington thorn
Crataegus cordata
Thorn, Cockspur or Newcastle
Crataegus crus-galli
Wayfaring tree
Viburnum lantana
Witch-hazel
Hamamelis virginiana

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Shrubs for Foliage, Deciduous.
Height, 6 to 8 feet.

Chokeberry, Black
Aronia nigra
Common barberry
Berberis vulgaris
Dogwood, Panicled or Gray-stemmed
Cornus paniculata
Dogwood, Red osier
Cornus stolonifera
Five-leaved aralia
Aralia pentaphylla. Acanthopanax pentaphyllum
Hazelnut
Corylus americana
Hazelnut, Beaked
Corylus rostrata
Honeysuckle, Fragrant
Lonicera fragantissima
Honeysuckle, Morrow's
Lonicera morrowii
Spiraea
Spiraea bracteata or *S. rotundifolia*
Spiraea, Bridal wreath
Spiraea prunifolia var. *flore pleno*
Spiraea, Van Houtte's
Spiraea Van Houttei
Syringa
Philadelphus inodorus
Sumac, Dwarf or Shining
Rhus copallina
Viburnum, Red-berried
Viburnum wrightii
White kerria
Rhodotypos kerrioides
Withe-rod
Viburnum cassinoides

Height, 2 to 4 feet.

Alpine buckthorn
Rhamnus alpina
Barberry, Japanese
Berberis thunbergii
Coralberry, or Indian currant
Symphoricarpus vulgaris
Downy arrowwood
Viburnum pubescens
Fragrant sumac
Rhus canadensis [—*R. aromatica*]
Leatherwood or Wickopy
Dirca palustris
Sand or Dwarf cherry
Prunus pumila
Shrubby St. John's wort
Hypericum prolificum
Snowberry
Symphoricarpus racemosus
Syringa, Dwarf
Philadelphus coronarius var. *namus*
Viburnum, Maple-leaved, or Dockmackie
Viburnum acerifolium
Wild roses
Rosa lucida and *R. nitida*

Evergreen Shrubs.

Height to 4 feet

Andromeda
Andromeda [—*pieris*] *floribunda*
Common juniper
Juniperus communis var. *montana*
English yew
Taxus baccata var. *repandens*
Inkberry
Ilex glabra

Height, 4 to 10 feet

Ground hemlock or Native yew
Taxus canadensis
Japanese yew
Taxus cuspidata

Berry-bearing Shrubs and Trees.
Height, 10 to 15 feet.

Alternate-leaved dogwood
Cornus alternifolia
Arrowwood
Viburnum dentatum
Black haw
Viburnum prunifolium
Buckthorn
Rhamnus cathartica
Common or Black elderberry
Sambucus canadensis
Highbush cranberry
Viburnum opulus
Mountain ash
Sorbus americana
Nannyberry
Viburnum lentago
Tartarian or Bush honeysuckle
Lonicera tatarica
Washington thorn
Crataegus cordata
Wayfaring tree
Viburnum lantana

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Berry-Bearing Shrubs and Trees (continued)

Height, 6 to 8 feet.

Common barberry
Berberis vulgaris
Panicled dogwood
Cornus paniculata [—*C. candidissima*]
Red elderberry
Sambucus racemosa
Red osier dogwood
Cornus stolonifera
Rose, Sweetbrier
Rosa rubiginosa
Rose, Japanese
Rosa rugosa
Rose, Rambler
Rosa multiflora
Viburnum
Viburnum Wrightii
Winterberry
Ilex verticillata
Withe-rod
Viburnum cassinoides

Height, 2 to 4 feet.

(These shrubs sometimes reach 5 or 6 feet in height, but they can be cut back easily).

Chokecherry, Black
Aronia [—*pyrus*] *nigra*
Coralberry
Symphoricarpus vulgaris
Inkberry
Ilex glabra
Japanese barberry
Berberis Thunbergii
Maple-leaved viburnum
Viburnum acerifolium
Snowberry
Symphoricarpus racemosa
Wild roses
(especially Rosa lucida)

Shrubs with Good Autumn Color.

Blackberry
Rubus allegheniensis
Black haw
Viburnum dentatum
Black raspberry
Rubus occidentalis
Bridal wreath
Spiraea prunifolia var. *flore pleno*
Buffalo or Flowering currant
Ribes aureum. (*R. odoratum*)
Bush cranberry
Viburnum opulus
Dockmackie or Maple-leaved viburnum
Viburnum acerifolium
Dogwood, Red osier
Cornus stolonifera
Dogwood, Round-leaved
Cornus circinata
Japanese or Thunberg's barberry
Berberis Thunbergii
Sheepberry or Nannyberry
Viburnum lentago
Sumac, Dwarf
Rhus copallina
Sumac, Smooth
Rhus glabra
Sumac, Staghorn
Rhus typhina
Swamp dewberry
Rubus hispidus
Thornapple or Washington thorn
Crataegus cordata
Wild roses
(tall) *Rosa lucida*
(dwarf) *Rosa blanda*

Shrubs with Attractive Winter Twigs.

Black raspberry
Rubus occidentalis
Staghorn sumac
Rhus typhina [— *R. hirta*]
Wild rose, tall
Rosa lucida
(should be planted in mass and cut down every three or four years)

Vines.

American or Five-leaved ivy or Virginia creeper
Ampelopsis quinquefolia or *Parthenocissus quinquefolia*
Bittersweet
Celastrus scandens
Honeysuckle, Trumpet
Lonicera sempervirens
Honeysuckle, Purple-flowered
Lonicera glauca var. *Donglasii*
Virgin's bower, Purple
Clematis verticillaris
Virgin's bower, Virginia
Clematis virginiana
Wild grape
Vitis labrusca, and *Vitis vulpina*

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Even Common Willows Have a Picturesque Beauty all their Own. (By courtesy of the Madison Park and Pleasure Drive Association.)

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Street of Norway Maples. (By courtesy of John Wiley & Sons, New York, publishers of *Studies of Trees*, by J. J. Levison.)

Street of Sycamore Trees Twelve Years Old at Washington, D. C. (By courtesy of John Wiley & Sons, New York, publishers of *Shade Trees in Towns and Cities*, by William Solotaroff.)

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Hedge Plants.

Buckthorn, 7 to 10 feet,
Rhamnus cathartica

Japanese or Thunberg's barberry, 2 to 4 feet,
Berberis Thunbergii

*Native Shrubs that will Grow on Wet Ground.

Black currant
Bittersweet
Bush cranberry
Buttonbush
Chokeberry
Dwarf wild rose
Elder
Red osier dogwood
Speckled alder
Sweet fern

Native Shrubs that will Grow on Poor or Light Soil.

Bush or Tartarian honeysuckle
Common barberry
Common juniper
Coralberry
Dwarf cherry
Dwarf wild rose
New Jersey tea
Round-leaved dogwood
Shrubby St. John's wort
Smooth sumac
Staghorn sumac
Sweet fern
Witch-hazel

Native Shrubs that will Grow in Light Shade.

Arrowwood
Black raspberry
Bladder nut
Burning bush
Bush cranberry
Bush honeysuckle
Common juniper
Coralberry
Fragrant sumac
Gooseberry
Ground hemlock
Maple-leaved viburnum
New Jersey tea
Ninebark
Prickly ash
Red-berried elder
Round-leaved dogwood
Sheepberry
Silky dogwood
Snowberry
Sweet fern
Winterberry
Witch-hazel

*This list and the two that follow it include shrubs recommended by Mr. John Tiplady in the report of the Wisconsin State Horticultural Society for 1907.

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LAWS AND ORDINANCES RELATING TO PARKS AND SHADE TREES.

The state laws make provision for the protection of shade trees on the highways and for the creation and maintenance of county, city, town and village parks and for the planting and care of shade trees on streets. For the benefit of those who wish to refer to the state laws, the following references are given from the Wisconsin statutes:

Ownership of trees	Sec. 1341
Planting of trees on highways by owners of adjoining land	Sec. 1342
Planting of hedges and protection fences by owners of adjoining land	Sec. 1343
Bounties for planting shade trees on highways	Sec. 1344
Destruction or injury of shade trees on highways or village streets in incorporated villages	Sec. 904m
Mutilation of trees in the construction of electric lines	Sec. 1329a
Injuring public or private shade trees	Sec. 1345
Creation and powers of county park commissions in counties having a population of at least 150,000	Secs. 697–68 to 697–73
Powers of village boards to create parks and to plant and regulate the planting of shade trees	Sec. 893, subsection 14
Control of city street park strips by city park commissioners under the direction of the common council	Sec. 925–171a
Powers of city councils to acquire parks, to regulate planting of ornamental shade trees	Sec. 925–52 (29) Sec. 925–52 (55)

A City Shade Tree Ordinance.

It is important that every city adopt a good ordinance for the establishment and protection of street trees.

One of the best forms of a city shade tree ordinance, that of East Orange, New Jersey, is given in *"Shade Trees in Towns and Cities" by William Solotaroff, on page 273.

*This book is published by John Wiley & Sons, New York, and it is an excellent reference book, which should be in libraries.

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Our Ordinary Country Roads Might Become Beautiful Woodland Drives if the Unused Portions were planted with Native Trees. Farwell Drive near Madison, Wisconsin. (By courtesy of the Madison Park and Pleasure Drive Association.)

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